

Hazardous Area Heating Equipment NEC 500 and 505 Comparison

We offer a range of heaters, all ETL approved to UL and CSA hazardous location standards. This document details the specific hazardous location markings of each product and the differences between them.

Class 1 Induction Base



Half Height Induction Heater



The Induction Heaters are every efficient, no maintenance heaters for drums and containers up to 55Gal (205L). They have the following markings:

Full Size:

Class I/Division 1/Zone 1 AEx e IIC 170°C (T3) Gb

Class I/Division 1/Zone 1 Ex e IIC 170°C (T3) Gb

Bottom Heating:

Class I/Division 1/Zone 1 AEx e IIC 200°C (T3) Gb

Class I/Division 1/ Zone 1 Ex e IIC 200°C (T3) Gb

Conforms to UL Std.60079-0, UL Std. 60079-7, ANSI/UL Std. 499

Certified to CAN/CSA Std. C22.2 No.60079-0, CAN/CSA C22.2 No.60079-7,

CAN/CSA C22.2 No.88

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The Class I, Division 1, Zone 1 heating jackets are available in many standard and custom sizes for heating containers in Division 1, Zone 1 Hazardous Locations. They have the following markings:

Class I, Division 1, Zone 1, IIC T3 ;
Class II, Div. 2, Groups EFG, T3
AEx e IIB+H2 T3 Gb,
Ex e IIB+H2 T3 Gb,

Class II Zone 21 dust marking and T4 marking available on request

Conforms to UL Std.60079-0, UL Std. 60079-7, UL Std. 60079-31, ANSI/UL Std. 499
Certified to CAN/CSA Std. C22.2 No.60079-0, CAN/CSA C22.2 No.60079-7,
CAN/CSA Std. C22.2 No.60079-31, CAN/CSA C22.2 No.130

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CID2:



The Class I Division 2 range of heating jackets are available for many container sizes as well as virtually any custom size. Available in many power and temperature options, they have the following markings:

Class I, Division 2, Groups ABCD, T3
Class II, Division 2, Groups EFG, T3
Class I, Zone 2, IIC, T3
Class II, Zone 22, IIIB, T3
Class III, Division 1 and 2, T3

T4 marking available on request

Conforms to ANSI/UL Std. 499, ISA Std. 12.12.01
Certified to CAN/CSA C22.2 No.130



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NEC 500 / NEC 505

The National Electric Code defines Hazardous Locations according to 2 different standards; NEC 505 and NEC 500. NEC 505 defines the Zone System and NEC 500 defines the Division System.

Comparison Between Zones and Classes/Divisions		
Standards	NEC 505	NEC 500
Atmosphere		
Gases, Vapors	Zone 0	Class I Division 1
	Zone 1	
	Zone 2	Class I Division 2
Dusts	Zone 20	Class II Division 1
	Zone 21	
	Zone 22	Class II Division 2

AREA CLASSIFICATION			
CLASS I - FLAMMABLE MATERIAL			
	PRESENT CONTINUOUSLY	PRESENT INTERMITTENTLY	PRESENT ABNORMALLY
IEC/EU	ZONE 0	ZONE 1	ZONE 2
USA NEC 505 & 500	ZONE 0	ZONE 1	ZONE 2
	DIVISION 1		DIVISION 2
CANADA CEC SECTION 18 & ANNEX J	ZONE 0	ZONE 1	ZONE 2
	DIVISION 1		DIVISION 2

Our products are certified to Class 1, Division 1, Zone 1 extending our level of protection into Division 1. The Zone classification system divides Division 1 into two zones. Zone 0 is generally only considered for mining applications, underground, or for very high concentrations of explosive gas that occur continuously. Therefore, where most industrial applications state Division 1, it will be equivalent to the Zone 1 certification. The final decision should rest with the user's risk assessment of the area in question.



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NEC 505 defines the following:

Zone Definitions

A place in which an explosive atmosphere in the form of a gas/vapor (or cloud of combustible dust) in air...

Zone 0 (Zone 20)

...is present continuously, or for long periods or frequently.

Zone 1 (Zone 21)

...is likely to occur in normal operation occasionally.

Zone 2 (Zone 22)

...is not likely to occur in normal operation but if it does occur, will persist for only a short period.

NEC 500 defines the Division System:

Class/Division Definitions

Class I – Contains flammable gasses or vapors in quantities large enough to produce an explosion.

Class II – Is hazardous due to the presence of combustible dust in the air.

Class III – Contains easily ignitable fibers or flyings in the air. However, the quantity of fibers and flyings suspended in the air are not likely to be large enough to cause an explosion.

Division 1 – There is a high probability of an explosive atmosphere in normal operation. This can be for part of the time, up to all the time.

Division 2 – There is a low probability of an explosive atmosphere present during normal operation.



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Marking Explanations

The gas group IIC and the temperature classification T3 indicate that both may be used with all of the listed gases in each of the temperature classification categories T1, T2, and T3 and correlate to NEC 500 Gas Groups A through D.

The 338F/170°C marking indicates that this equipment will not exceed this temperature under normal operating conditions (includes 10% over-voltage and 104°F(40°C) ambient). The equivalent maximum temperature marking is 392F/200°C Bottom Heating product. It is important to note that when determining which temperature classifications are appropriate for the area of use, reference should be made to the auto-ignition temperature of the gasses present, rather than the flash point. These NEC 505 temperature classifications directly correlate to the temperature classifications outlined in NEC 500. Please see the charts below:

HAZARDOUS ATMOSPHERE CATEGORY (GAS OR DUST GROUPING)				
Explosive Atmosphere	Typical Hazard Material	North America NEC 500 - 503 / CEC 18		NEC 505 / CEC 18
		Hazard Category	Grouping	Gas Grouping
Gases and Vapors	Acetylene	Class I	Group A	IIC
	Hydrogen	Class I	Group B	IIC or IIB + H2
	Ethylene	Class I	Group C	IIB
	Propane	Class I	Group D	IIA
Dusts	Metal Dust	Class II	Group E	-
	Coal Dust	Class II	Group F	-
	Grain Dust	Class II	Group G	-
Fibers and Flyings	Wood, Paper, or Cotton Processing	Class III	-	-



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Combustible and flammable gases and vapors are divided into four Groups. The classification is based on maximum explosion pressures, and maximum safe clearance between parts of a clamped joint in an enclosure per NEC section 500-5(a)(4) FPN No. 2.

Refer to Appendix A for diagrams that show the relationship between Classes, Divisions and Groups.

The table below provides examples of which materials actually make up specific Groups.

Table E.

Class	Division	Group	Flammable Material	Maximum (MESG)	Minimum
Class I	Division 1 & 2	A	Acetylene	—	—
Class I	Division 1 & 2	B	<ul style="list-style-type: none"> • Hydrogen • Butadiene • Ethylene Oxide • Propylene Oxide 	≤ 0.4 mm	≤ 0.4
	Division 1 & 2	C	<ul style="list-style-type: none"> • Ethylene • Cyclopropane • Ethyl Ether 	> 0.45 mm ≤ 0.75 mm	> 0.4 ≤ 0.8
Class I	Division 1 & 2	D	<ul style="list-style-type: none"> • Propane • Acetone • Ammonia • Benzene • Butane • Ethanol • Gasoline • Methanol • Natural Gas 	≥ 0.75 mm	> 0.8

Temperature Class Definition

The temperature classes are used to designate the maximum operating temperatures on the surface of the equipment which should not exceed the ignition temperature of the surrounding atmosphere. Ignition temperature is the minimum temperature required, at normal atmospheric pressure in the absence of a spark or flame, to set afire or cause self-sustained combustion independently of the heating or heated element.



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Table K. Class 1 Temperature Class Comparison

Zone 0, 1, and 2	Division 1 and 2	Maximum Temperature
T1	T1	450°C (842°F)
T2	T2	300°C (572°F)
	T2A	280°C (536°F)
	T2B	260°C (500°F)
	T2C	230°C (446°F)
	T2D	215°C (419°F)
T3	T3	180°C (356°F)
	T3A	180°C (356°F)
	T3B	165°C (329°F)
	T3C	160°C (320°F)
T4	T4	135°C (275°F)
	T4A	120°C (248°F)
T5	T5	100°C (212°F)
T6	T6	85°C (185°F)